

**Title: Crazy Critter Combos
or A Crash Course on Creative Combinations**

Link to Outcomes:

- **Problem Solving** Students will experience successful problem solving through cooperative exploration of mathematical concepts, manipulation and construction of concrete materials, and application of generalizations in the formulation of appropriate problems from their everyday experience.
- **Communication** Students will communicate mathematically in verbal, pictorial and written form.
- **Reasoning** Students will explore and list possible combinations initially through the manipulation of models, and later by the construction of tree diagrams.
- **Connections** Students will formulate appropriate situations relating to everyday life in which all possible outcomes are considered.
- **Statistics & Probability** Students will collect, organize, describe, and analyze data.
- **Patterns and Relationships** Students will be encouraged to identify patterns that can be used in developing strategies to describe all possible outcomes.

Brief Overview:

This learning unit introduces combinations through a variety of activities progressing from the concrete to the abstract. The students will gain a greater awareness of the many choices facing them in everyday life.

Grade/Level:

Grades 4-6

Duration/Length:

These activities should take approximately four 45-minute periods over 4 days.

Prerequisite Knowledge:

No previous knowledge of this subject is necessary.

Objectives:

Students will:

- model combinations in increasing levels of difficulty.
- collect and organize data.
- interpret data.
- make generalizations.
- predict outcomes.
- draw conclusions.
- explore the use of a tree diagram as an effective tool for organizing data.

Materials:

1 per student of the following:

- Puzzle pattern (Activity Sheet 1)
- Tree diagram skeletons
- Markers or crayons
- Scissors
- Flipbook pattern (Sheet 3)

Development/Procedures:

Day 1: Each student constructs a two part animal puzzle. Student and partner discover and name all animals that can be made with their two puzzles.

- Introduction may be made with 2 or 3 interchangeable animal toys if available, (2 part: head-tail; 3 part: head-middle-tail), or similar size animal pictures cut in halves.
- Focus grade level discussion on creation of crazy critters.
- Using activity sheet 1, students draw and color animals of their choosing with a head section on the left puzzle piece and tail section on the right puzzle piece. The first syllable of the animal's name should be placed at the bottom of the left puzzle piece and the second syllable should be placed at the bottom of the right puzzle piece. (See teacher resource 1)
- Cut puzzle along dotted line on pattern.
- Exchange head and tail pieces with a partner to create a new critter.

- Continue to identify all possible combinations of crazy critters using the two part puzzles of both partners.
- List all 4 crazy critter combos.

Day 2: Whole class discussion of Day 1 leads to further exploration of combinations given additional choices.

- Discuss results of Day 1 activities.
- Discover in groups of 3 or 4 all possible outcomes, using their two part puzzles.
- Record data, list outcomes, and identify patterns.
- Introduce and complete (by teacher) a corresponding tree diagram on overhead or blackboard, using one student group's outcomes list.

Day 3: Building on the experiences of Days 1 and 2, each student constructs a three part animal flipbook, consisting of three pages.

- Review data and patterns identified in previous activities.
- Introduce activity worksheet 2, and Crazy Critter Combos Flipbook.
- Demonstrate (by teacher) the correct positioning of animal's head on the left section of the flipbook page, the animal's mid-section on the center flipbook page, and the animal's tail on the right.
- Encourage predictions about the number of possible "combination critters".
- Identify (by teacher) the location and placement of animal name. Three syllable animal names are recommended for this activity with placement of first syllable on the left section, second syllable on the center section, and third syllable on the right section.
- Draw, color, and name one animal on each flipbook page.
- Cut on solid lines, and assemble flipbook.
- Explore combinations of Crazy Critters.

Day 4: All possible outcomes are identified and a corresponding tree diagram is completed by each student.

- Discover, name and list all possible combinations (27).
- Distribute tree diagram skeleton (activity worksheet 4) to students.
- Direct placement of Crazy Critter names on individual tree diagrams, beginning with Head-1, Middle-1, Tail-1 through Head-1, Middle -2, Tail-1.
- Complete individual tree diagrams.
- Compare outcomes with predictions.
- Encourage advanced students to derive and test a formula for identifying the number of possible outcomes in a given situation.

Evaluation:

Level 1: Teacher provides framework of a situation in which multiple outcomes are possible, such as double dip ice cream cone choices (Two cone choices, sugar and wafer, and three ice cream flavors may be considered).

Level 2: Student groups formulate a situation and identify all possible outcomes. Suggestions include pizza and toppings, wardrobes, and menu choices.

Extension/Follow Up:

The concept of probability may be explored using data collected during evaluation activities.

Authors:

Dale Foster
Aletheia School
Newark, DE

Deborah McCann
Wilmington Christian School
Newark, DE

Joye Outlar
Wilmington Christian School
Newark, DE

TEACHER RESOURCE 1

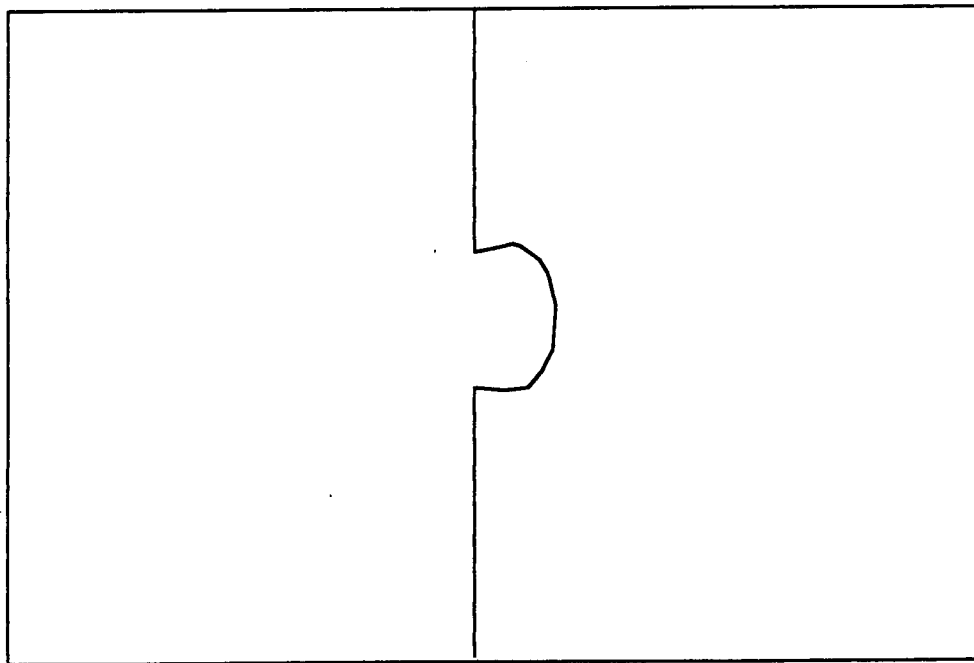
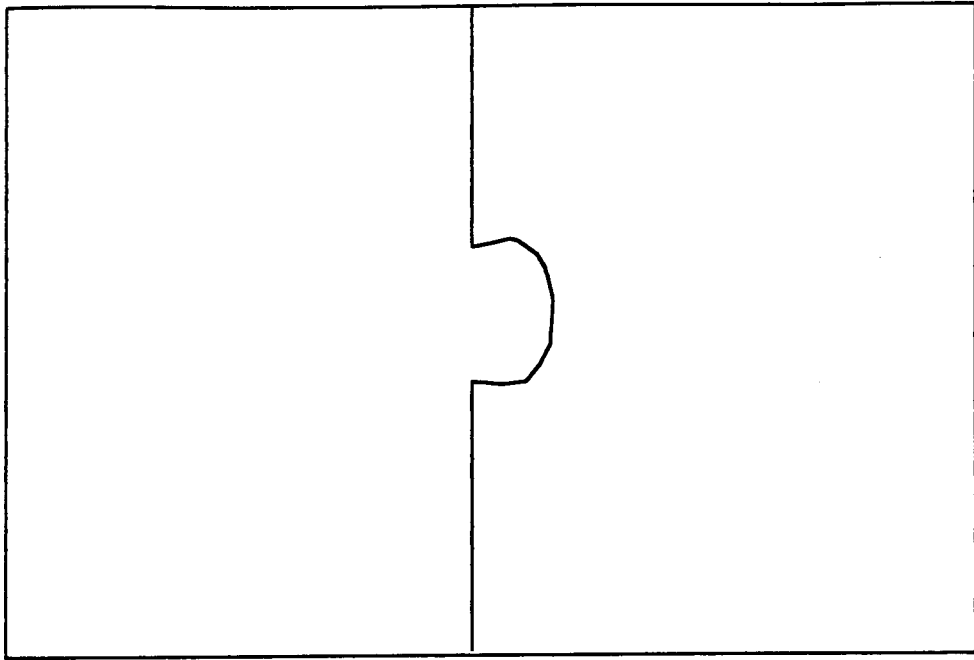
2-SYLLABLE ANIMALS

Sting-ray
Li-on
Mon-key
Ti-ger
Dol-phin
Tou-can
Wal-rus
Gi-raffe
Mon-goose
Din-go
Rein-deer
Chick-en
Cray-fish
Lob-ster
Crick-et
Ot-ter
Rac-coon
Opos-sum
Rab-bit
Don-key
Chip-munk
Gec-ko
Li-zard
Py-thon
Wea-sel

3-SYLLABLE ANIMALS

Pi-ra-nha
El-e-phant
Moc-ca-sin
Chim-pan-zee
Pel-i-can
But-ter-fly
Oc-to-pus
I-gua-na
Man-a-tee
Buf-fa-lo
Por-cu-pine
Di-no-saur
Croc-o-dile
Pla-ty-pus
Wol-ver-ine
Rott-wei-ler
Kan-ga-roo
Car-i-bou
Chin-chil-la
La-dy-bug
Sand-pip-er
Ant-eat-er
An-te-lope
Grass-hop-per
Cot-ton-tail

Activity Sheet 1

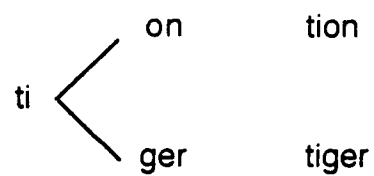
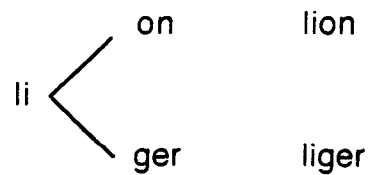
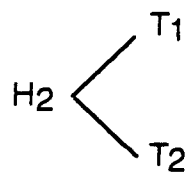
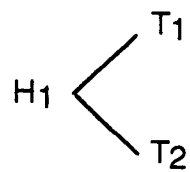


Activity Sheet 2

Puzzle Tree Diagram

(H - head T - tail)

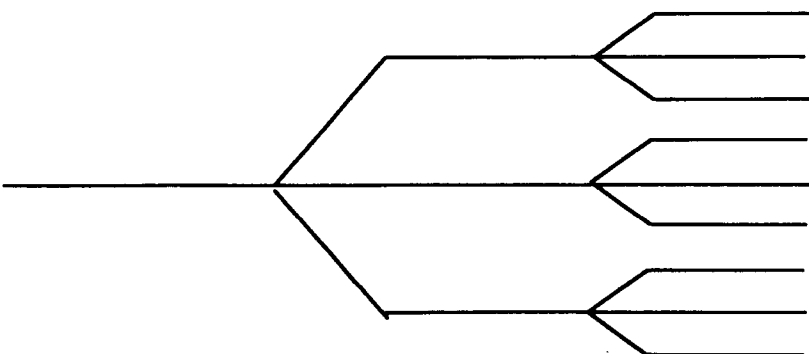
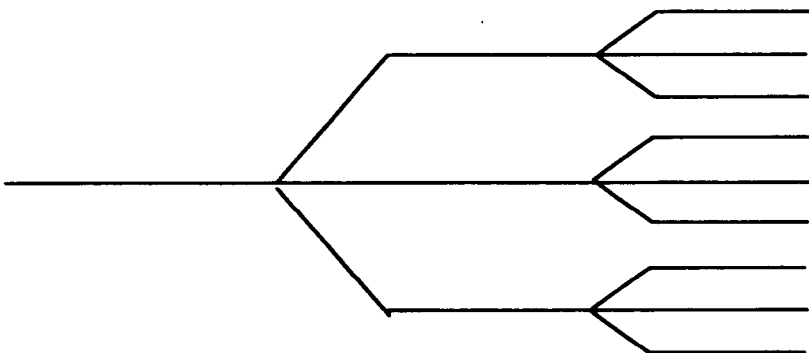
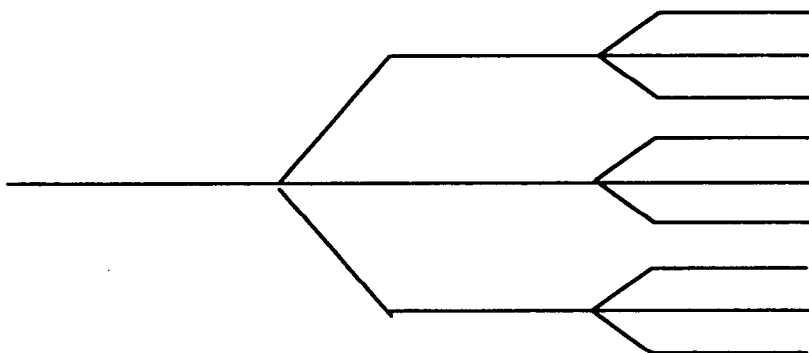
(ex.) lion tiger



Activity Sheet 4

Flip book
Tree Diagram

Outcomes

[illegible]

[illegible]

The diagram consists of three vertical rectangular boxes arranged horizontally. Above each box is a small star symbol. A dashed horizontal line runs across the top of the boxes. Below each box is a small rectangular box.